

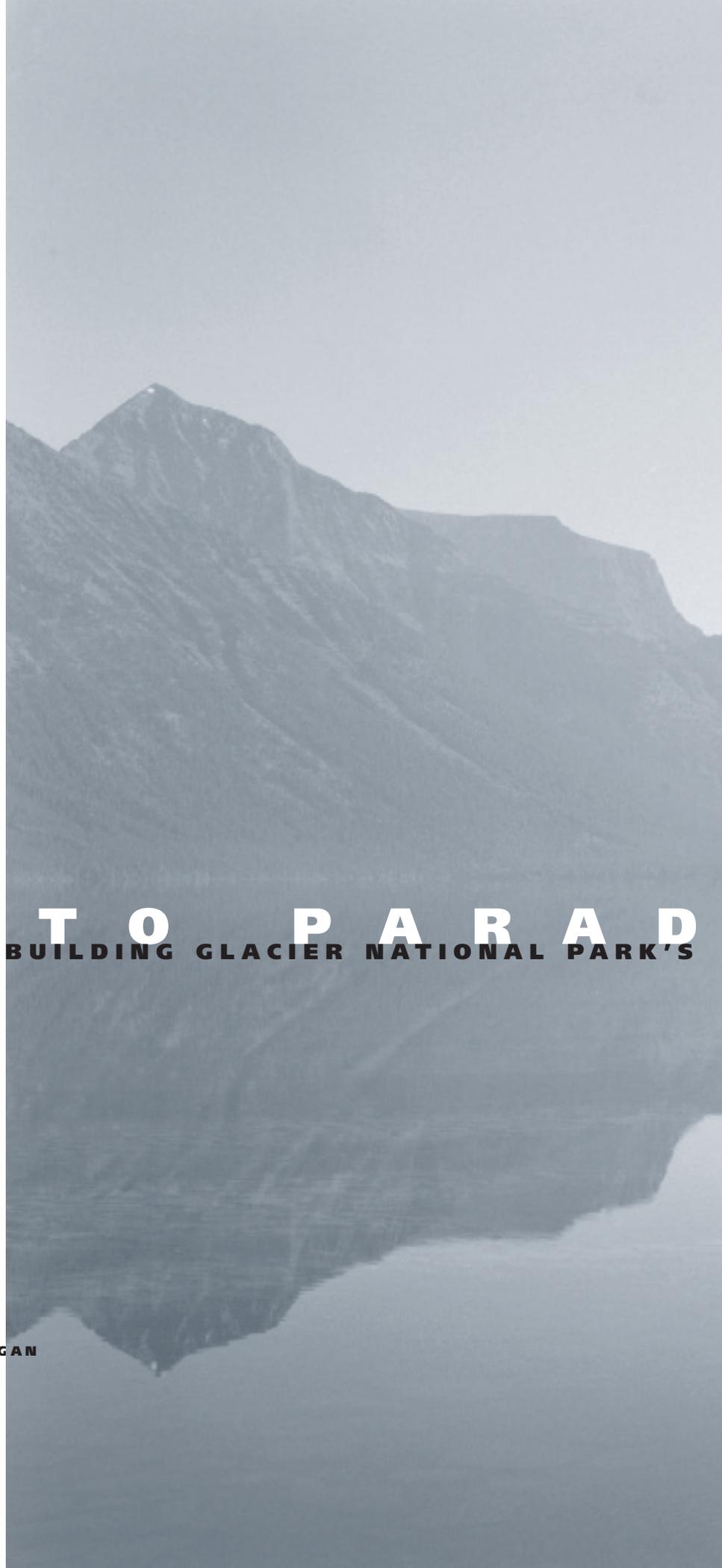
ALL PHOTOS MARTIN STURCHNIPS/HAER EXCEPT AS NOTED

ACCESS TO PARADISE

BUILDING GLACIER NATIONAL PARK'S

IN MANY WAYS, IT WAS TYPICAL OF ITS AGE, THE BOLD sort of thing that was common in an era of brashness, the kind of epic and dangerous undertaking that seemed a part of our national character. Going-to-the-Sun Road, which traverses Montana's Glacier National Park, goes through some of the most spectacular scenery in North America. Negotiating sheer cliff faces and dizzying heights as it crosses the Continental Divide, it is one of the most remarkable engineering and construction feats in the National Park System. Built between 1921 and 1932, it has been declared both a civil engineering landmark and a national historic landmark, but its winding 50-mile course through a landscape shaped by glaciers also defines a seminal moment in America's relationship with its most treasured places. **BY JOE FLANAGAN**

Right: Though Lake McDonald, like the park itself, was sculpted by glaciers, many of the views were created by engineers and landscape architects.





I S E
GOING-TO-THE-SUN ROAD



GEORGE GRANT/NPS HARPERS FERRY COLLECTION

GOING-TO-THE-SUN ROAD WAS NOT JUST A WAY TO CONVEY PEOPLE INTO Glacier's inaccessible interior, it was an explicit effort to put the landscape on display. The road is not, as one might surmise, an engineer's practical solution to getting from point A to point B. It was built in deference to nature, cut, chiseled, and blasted into the mountains and through the valleys. While it was a monumental feat of logistics and construction, an often death-defying exercise in engineering heroics, the road is, in essence, a celebration of one of the crown jewels of America's natural legacy.

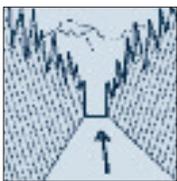
The "landmark in the sky" was officially opened in a midsummer ceremony 75 years ago. Since then, countless visitors have followed its meandering course through breathtaking vistas to the crest of the Continental Divide. "The Sun Road continues to serve as a national model for context-sensitive road design and construction," says a National Park Service press release announcing the 75th anniversary. In 1910, when the project was conceived, the national parks were in

their infancy, grappling with how to make themselves accessible, just beginning their sometimes paradoxical mission of showcasing the natural beauty while preserving it for posterity. To figure out how to run a road east to west across the width of Glacier, the National Park Service—established in 1916—collaborated with the Bureau of Public Roads (now the Federal Highway Administration), a partnership that continues today. The agencies paired their strengths, engineering and preservation, formalized today as the Park Roads and Parkways Program. "Glacier became a laboratory for exploring the preservation

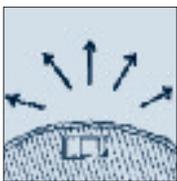
Above: The East Side Tunnel, bored through rock, with its portals framing the distant peaks. The ranger in this photo, taken the year the road was done, stands next to a parapet intended to blend into the landscape. **Right:** The same view decades later, taken by HAER, with the interior finished and the road paved, a process not completed until 1952. The context-sensitive design was visionary, says NPS historian Linda McClelland. "Going-to-the-Sun Road was the proving ground where ideas were worked out on a grand scale, for the first time, with spectacular results."



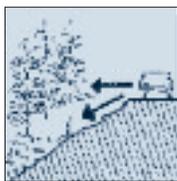
GRADE CHANGE



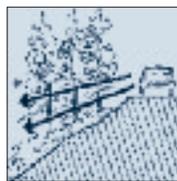
AXIAL VIEW



PANORAMA



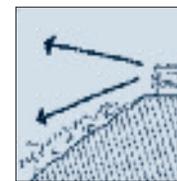
INTERIOR VIEW



FILTERED VIEW



FRENCH CUT



CANOPY CUT

VISTAS BY DESIGN

Many views in the national parks appear to be shaped by nature, when in fact they are carefully choreographed. Glacier offers a tour-de-force of the technique, with memorable motoring the goal of both the original planners and today's road managers, who follow a set of vista management guidelines. **Grade changes** enhance the drama of breathtaking scenery; where the road hugs the cliffs, sharp dropoffs and a narrow width combine to heighten the feeling of exposure. Long, straight stretches give drivers **axial views** with ample time to take in the landscape and focus on major features such as Jackson Glacier and the Garden Wall. **Panoramas** are created by pullouts, where visitors take in an expansive sweep. An **interior view** of a forest is encouraged by selective cutting of lower limbs by the roadside. A **filtered view** of background landscapes is achieved by a similar technique. The **French cut** creates a narrow window that frames selected features, while the **canopy cut** opens the vista entirely. As experienced by the motorist, Glacier becomes a cinematic unfolding of lakes, mountains, cliffs, and streams, punctuated by changing views of vegetation and subtle variations in road alignment and grade.

THE ROAD IS NOT, AS ONE MIGHT SURMISE, AN ENGINEER'S



PRACTICAL SOLUTION TO GETTING FROM POINT A TO POINT B.

IT WAS BUILT IN DEFERENCE TO NATURE, CUT, CHISELED, AND BLASTED INTO THE MOUNTAINS AND THROUGH THE VALLEYS. WHILE IT WAS A MONUMENTAL FEAT OF LOGISTICS AND CONSTRUCTION, AN OFTEN DEATH-DEFYING EXERCISE IN ENGINEERING HEROICS, THE ROAD IS, IN ESSENCE, A CELEBRATION OF ONE OF THE CROWN JEWELS OF AMERICA'S NATURAL LEGACY.

of scenery and developing design standards for roads that seemingly lie lightly on the land,” says Linda McClelland, a National Park Service historian and author of *Building the National Parks*.

Coincident with the anniversary, the road is undergoing a rehabilitation, which a former FHWA engineer compared to the restoration of the Statue of Liberty. Erosion and traffic are compromising the roadbed. Stone guardrails are crumbling, in some cases sheared away by rockslides and avalanches. Tunnels and arches are deteriorating. In 2002, the project was slated to take seven to eight years at a cost of \$150-170 million, remarkable not only for its scope, but for its attention to detail. The NPS Historic American Engineering Record recorded the road during two visits, and Glacier is the focus of an NPS Teaching with Historic Places lesson plan, which places the park’s far-sighted stewardship in the context of the astounding natural history.

ENGINEERING FINESSE

One of the West’s great engines of change reached northern Montana in 1891. That year, the Great Northern Railway completed its track



around the south end of what would become the park. This brought a sharp rise in tourism and settlement. Two years later, the line was completed all the way to the Pacific, putting Glacier on a transcontinental route. The wonders of its interior must have beckoned Victorian travelers, who could see the peaks and imagine the world within. The terrain restricted access largely to the outskirts and the lakeshores. Arriving by train, visitors took a buckboard or stagecoach over rough roads to one of the few shoreline hotels. Motor launches took them deeper into the interior. The intrepid could hike in, or take a horseback tour.

Congress designated Glacier a national park in 1910. It was the dawn of the automobile, an unprecedented new way to see the land. The parks were a big attraction. Cars and tour buses replaced the wagons and stagecoaches, but Glacier’s interior was still largely out of reach. Engineers and landscape architects from the National Park Service and the Bureau of Public Roads began to ponder a road.

Left: Belton Bridge on the Flathead River, from 1920 to 1938 the western entrance to the park. Above: Modern construction equipment did extreme duty during the road-building, but often workers had to depend on old technology like horse-drawn graders.

ABOVE: GLACIER NATIONAL PARK

A route was proposed in 1918. From the park's western entrance, it would follow the relatively flat terrain along Lake McDonald, skirt the base of the mountains, and then veer into Logan Creek Valley, where the natural path between the peaks narrows and begins a steep ascent. The plan, developed by National Park Service engineer George Goodwin, was straightforward and economical. It aimed to take Logan Pass, at the top of the Continental Divide, in a frontal assault, with eight

the Continental Divide, using the gently rising terrain to gain height, then make a hairpin turn of nearly 180 degrees. From there, it headed back toward the Rockies, only now at a considerable height. The road would stay out of Logan Creek Valley by running high alongside the nearly vertical mountain face known as the Garden Wall.

The proposal, far more costly and difficult than Goodwin's, was visionary. A shelf chiseled into the Garden Wall would not only carry the road at a comfortable, steady grade, but offer amazing views of the valley below. The National Park Service chose Vint's plan. "It was a calculated risk, and changed—for the better—how the agency built roads for the next two decades," says Ethan Carr, associate professor at the University of Virginia's school of architecture and author of *Wilderness by Design: Landscape Architecture and the National Park Service*. It was a critical early test for the fledgling National Park Service, Carr says, one it passed with high marks.

Congress approved \$100,000 annually through the early 1920s. Frank A. Kittredge, an engineer with the Bureau of Public Roads, led a survey team into the alpine region to map out 21 miles of the most difficult terrain. The crew rushed ahead of the fast-approaching winter, with daily climbs of several thousand feet, at times suspended over chasms by ropes to get measurements. It was dangerous and exhausting. Over three months, Kittredge's crew had a 300 percent attrition rate. His dedication did not go unnoticed by Stephen T. Mather, the first director of the National Park Service, who decided to form a partnership with the roads bureau. As construction crews worked their way toward each other from either end of the park, Congress increased funding by \$1 million in 1924.

ACROSS THE DIVIDE

Driving along the edge of Lake McDonald, one imagines how the first tourists found Glacier: silent, exotic, a secret alpine oasis deep in the wilderness. The stout trunks of a 500-year-old cedar forest drift by, its interior in perpetual twilight. "To many people, Going-to-the-Sun Road is the iconic experience of Glacier," says Amy Vanderbilt, the project's communications and outreach manager. She talks about what has made the park an international destination and World Heritage Site. Five different life zones converge here, grasslands, aspen parklands, montane forest, subalpine, and alpine tundra. Three major rivers have their headwaters here, too. Says Superintendent Chas Cartwright, "The upper McDonald Valley has remained a haven for grizzly bears and the elusive wolverine," a



GLACIER NATIONAL PARK

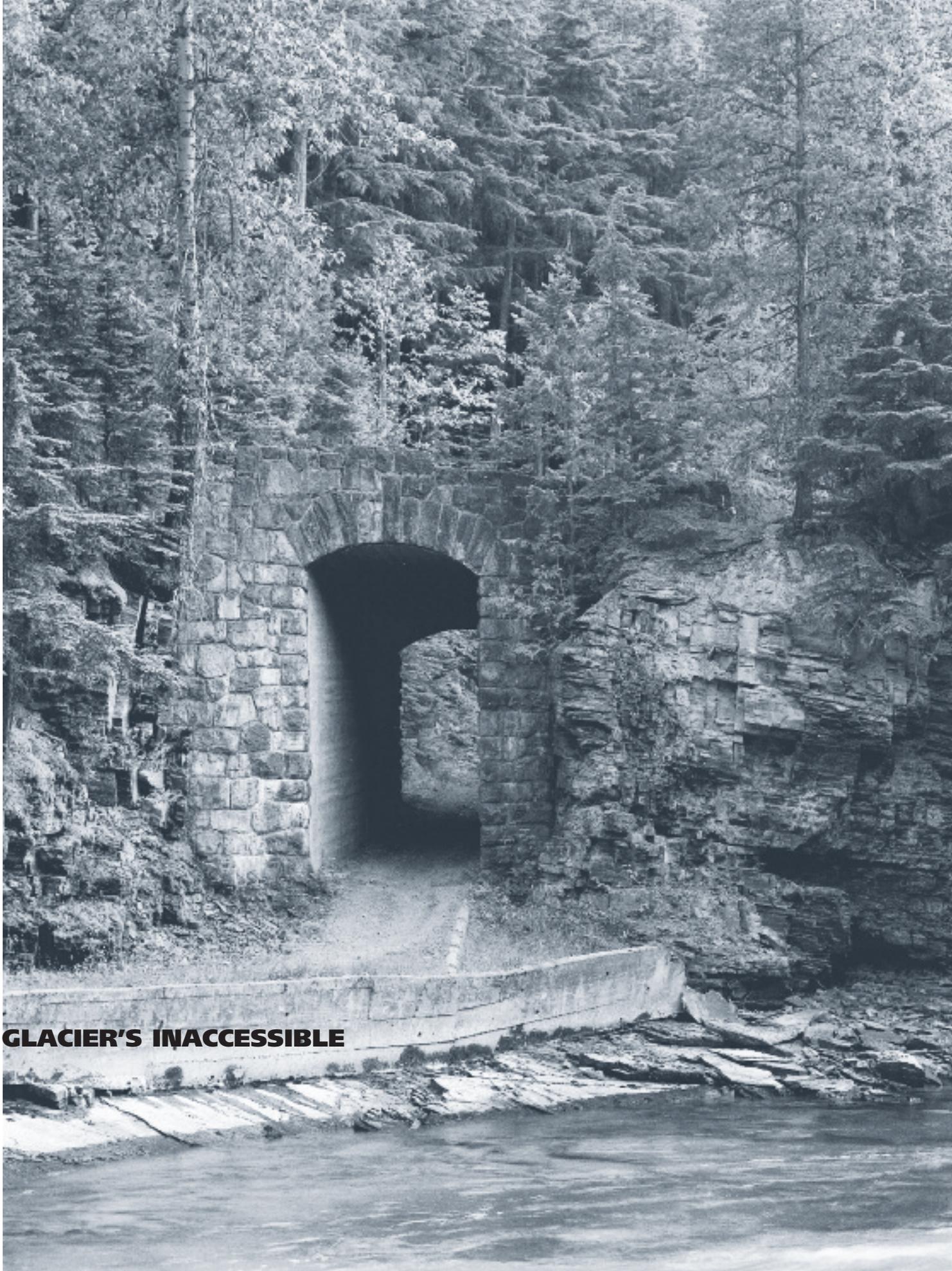
GOING-TO-THE-SUN ROAD WAS NOT JUST A WAY TO CONVEY PEOPLE INTERIOR, IT WAS AN EXPLICIT EFFORT TO PUT THE LANDSCAPE ON DISPLAY.

percent grades and numerous sharp turns and switchbacks. It was an impressive display of engineering, but some questioned the aesthetics. Would the road ruin the valley's beauty? Thomas Vint, a National Park Service landscape architect, said it would "look like miners had been in there." In addition, much of the route, along north-facing slopes, would be buried in snow far into the summer months.

Vint proposed an alternative, a defining chapter not only in park road construction but in the larger story of how we shape and experience the places we have saved for posterity. Rather than heading straight up the mountains, the route would actually head away from

Left: An open-top bus makes its way around the Loop, circa 1930s. Right: Underpass for a horse trail, one of about 17 notable concrete and masonry structures along the Going-to-the-Sun Road. By the time the road was completed, the automobile was dominant and trips on horseback declined.

direct result of the road's context-sensitive design. "The Loop," where the abrupt change in direction takes place, resembles a traffic circle. Knowing cars would have to slow down, roads designers turned the Loop into a viewing experience, with parking, a terrace,



INTO GLACIER'S INACCESSIBLE



THE RETAINING WALLS PRESENTED SOME OF THE MOST DIFFICULT



and cottonwoods, Douglas fir, aspen, and spruce to shelter the road from the winds. The mountainside here is steep, a preview of what will come later at the Garden Wall. Like much of the road beyond this point, the Loop was blasted out of the rock. But it was also shored up from below by a dry-laid retaining wall. Rounding the Loop, the climb along the Garden Wall to the Continental Divide begins.

When workers confronted the 12-mile stretch through the sub-alpine zone near the Rockies' crest, they did have steam shovels and dump trucks, but much was done with old technology. Horses pulled graders, with workers and materials suspended over the precipice with a wooden-pole contraption resembling a teepee. The retaining walls presented some of the most difficult construction challenges. In places, it is a 3,000-foot fall to the bottom. On one side, there is sheer rock, some of it weeping with glacial runoff. On the other side, thin air.



Designers specified native rock for walls and guardrails—low, rustic, and minimal. “Simple in line, and retiring,” Vint wrote.

While excavating, crews were prohibited from pushing material off the side in order to preserve the vegetation below. Fill was salvaged for shoring, with suitable rocks sorted out for guard rails and retaining walls. The native stone—red and green argillites and buckskin limestone—has the effect of making the road disappear from a distance. From Logan Pass, the only way one knows there is a road is the steady stream of cars creeping like dots on the mountainside.

On a hot August day, a long caravan of autos climbs along the Garden Wall. Engineers and tradesmen are at work on the road, the traffic stopped in one lane. Trucks line the narrow passageway, along with

CONSTRUCTION CHALLENGES. IN PLACES, IT IS A 3,000-FOOT FALL TO THE BOTTOM. ON ONE SIDE, THERE IS SHEER ROCK, SOME OF IT WEEPING WITH GLACIAL RUNOFF. ON THE OTHER SIDE, THIN AIR.

Left: Bored laterally through the rock, this view from inside the West Side Tunnel offers drivers a chance to pull over and look out across the mountains, with Heaven's Peak in the distance. **Above:** A ranger with one foot on the parapet in 1932.

ABOVE GEORGE GRANT/NPS HARPERS FERRY COLLECTION

THE BLACKFEET ARE AN ENDURING PRESENCE HERE, THEIR TRIBAL LANDS

piles of stone, generators, and banks of lights—the work goes on at night. Two men squat with hammers and brick chisels, shaping stone, the clank-clank-clank conjuring a similar scene 80 years ago.

At the Logan Pass visitor center, tourists park, go to breathtaking overlooks, and follow trails into alpine meadows. There is a thrill at knowing one is standing on the very spine of the Continental Divide.

Winters are severe here, with most of the road closed from October to June and sometimes longer, covered by up to 90-foot drifts in places. While the elements undermine the road, intense use during the short tourist season—some 3,500 vehicles every day—takes its toll, too.

RESTORING A 50-MILE LANDMARK

When the rehabilitation was being planned, the National Park Service supported a congressionally authorized citizen advisory committee. Closing the road completely may have bankrupted some of the small, family-owned local businesses dependent on tourism. This was one of the factors behind keeping the road open during the work.



How much will the project cost? Congress appropriated \$50 million, plus funds from the Park Roads and Parkways Program. But the troubled economy, and rising fuel prices, have doubled the cost. Parts of the road are done, but workers are up against short seasons and extreme geography. “How can we be most cost-effective with the dollars we have?” says Vanderbilt. “We don’t have the answer as we speak, but we’re prioritizing all the work that remains.” Though some of the native stone is reused, much has fallen thousands of feet, never to be recovered. This means finding quarries with the same material, which has to be tumbled to get the original look.

Above: Blackfeet camped at Logan Pass, on top of the Continental Divide, for the road’s dedication in July 1933. **Right:** Visitors follow the boardwalk to the snowfields around Clements Mountain near the Logan Pass visitor center.

ABOVE GEORGE GRANT/NPS HARPERS FERRY COLLECTION



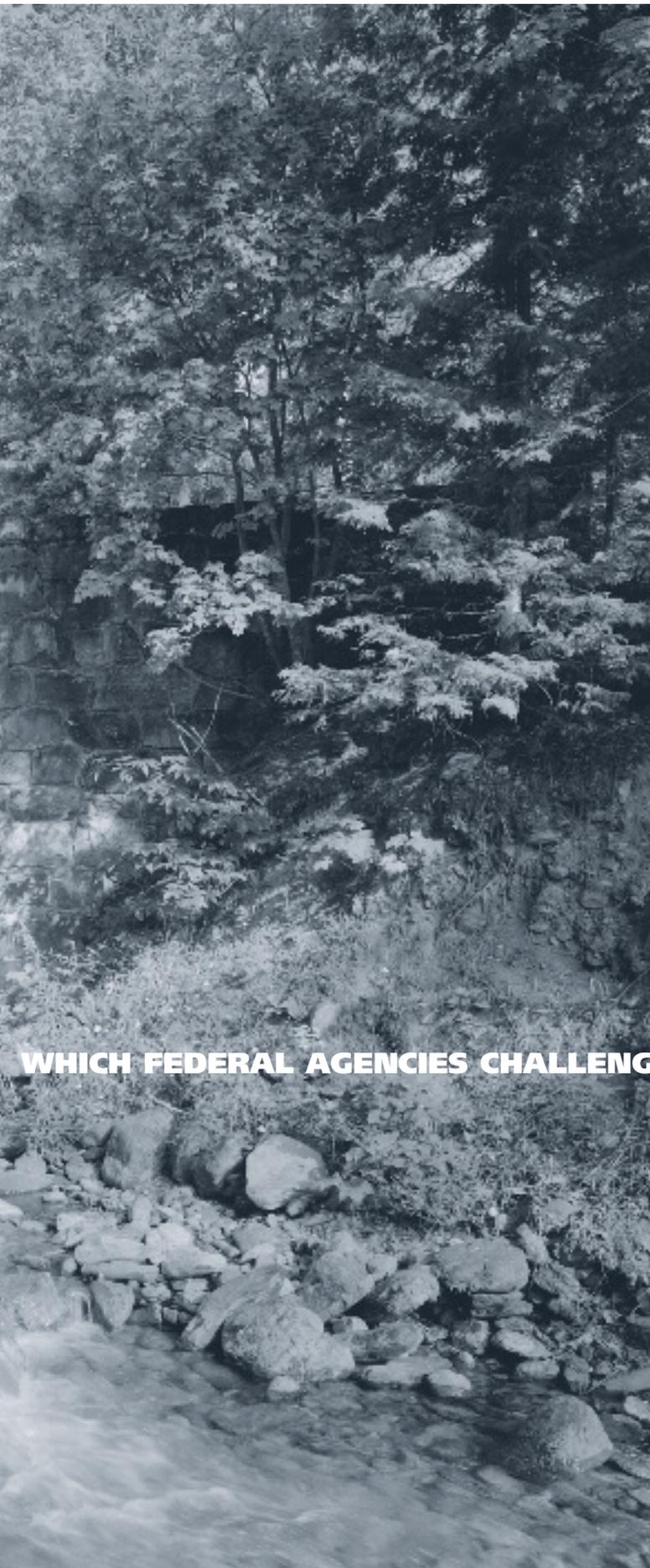
ABUTTING GLACIER'S EAST SIDE. IT IS NOT ONLY THE PLACE NAMES

THAT CALL THEM TO MIND. IT IS THE ICONIC LANDSCAPE. THERE IS A SENSE, EVERYWHERE, OF ANOTHER ORDER, ONE THAT HAS PREVAILED FOR MILLENNIA.





CARR SAYS THE ROAD REPRESENTS "A MOMENT OF TRUTH" IN



A TIMELESS IDEA

With the National Park Service approaching its 100th birthday, Going-to-the-Sun Road stands as a milestone. Carr says the road represents “a moment of truth” in which federal agencies challenged accepted engineering and design ideas and were given the funds to carry out their vision. That moment may not come again. “For many parks today,” he says, “the reality is declining budgets and increasing operating costs.” With that, he adds, come “profound” threats ranging from heavy visitation, to encroaching development, to environmental degradation. “It’s fair to ask what the critical decisions will be,” he says.

Descending the eastern slope of the Rockies, there is a change in the landscape. The mountains are stark and bare. Trees are stunted by the powerful winds. Cottonwoods line the rivers amidst rolling, grassy hills. Off in the distance is a bare, brown peak the Blackfeet know as Napi Point, where young men go for vision quests. The Blackfeet are an enduring presence here, their tribal lands abutting Glacier’s east side. It is not only the place names that call them to mind. It is the iconic landscape. There is a sense, everywhere, of another order, one that has prevailed for millennia. That, too, is preserved at Glacier.

Left and below: The numerous culverts and underpasses, made of native stone, were designed to naturally retire into the landscape, the approach a new way of treating lands set aside for posterity.



WHICH FEDERAL AGENCIES CHALLENGED ACCEPTED ENGINEERING AND DESIGN

IDEAS AND WERE GIVEN THE FUNDS TO CARRY OUT THEIR VISION. THAT MOMENT MAY NOT COME AGAIN. “FOR MANY PARKS TODAY,” HE SAYS, “THE REALITY IS DECLINING BUDGETS AND INCREASING OPERATING COSTS.”

In early 20th century America, when technology and enterprise stood astride a subjugated continent, there were places we could not bring ourselves to tame. Going-to-the-Sun Road was an expression of this new awareness. Its builders conquered the challenge of the Rockies, but in their triumph over nature, they wrote an ode to it as well.

For more information, contact Amy Vanderbilt, Glacier National Park, amy_vanderbilt@nps.gov. Also visit Glacier’s website at www.nps.gov/glac/index.htm.